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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,208	04/14/2005	Mitsuru Ueda	28955.1048	6424
27890 7590 12/11/2007 STEPTOE & JOHNSON LLP 1330 CONNECTICUT AVENUE, N.W. WASHINGTON, DC 20036			EXAMINER LEE, SIN J	
			ART UNIT 1795	PAPER NUMBER
			MAIL DATE 12/11/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/531,208	<b>Applicant(s)</b> UEDA ET AL.	
	<b>Examiner</b> Sin J. Lee	<b>Art Unit</b> 1795	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 September 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 and 19-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-23 is/are allowed.
- 6) ☒ Claim(s) 1-17, 24 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

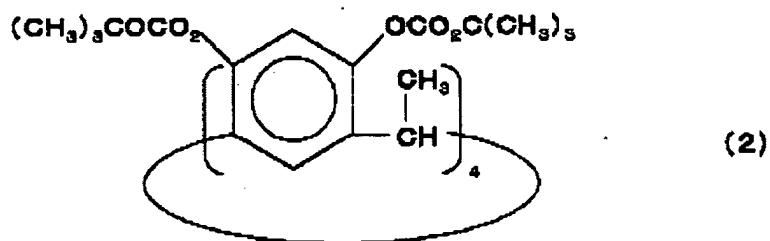
1. In view of the amendment, previous 102(b) and 103(a) rejections over Przybilla et al (Proceedings of SPIE) are hereby withdrawn.
2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

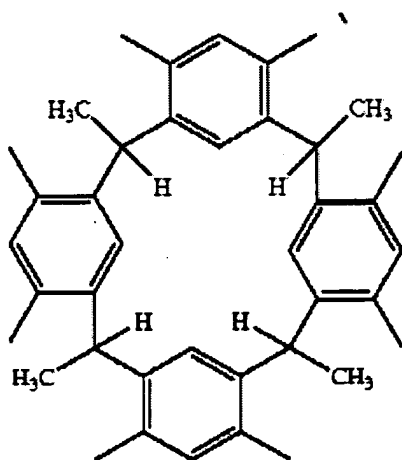
### ***Claim Rejections - 35 USC § 102***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1-8, 10, 12, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishikubo et al (JP 11-322656 and its English abstracts - Chemical Abstract 1999:744383 and DERWENT abstract).

Nishikubo teaches a composition containing a calix(resorcin)arene compound of formula (1) and a photoacid generator (see Chemical Abstract and the front page of the Japanese document). Specifically, Nishikubo teaches the following compound on pg.3 of the Japanese document (see also the second page of Chemical abstract):



Such compound teaches present compound of formula (1): present A is

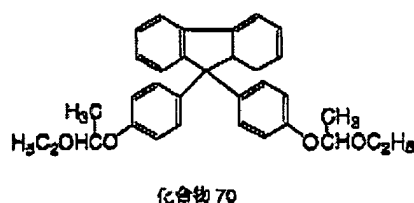


present B, C and D are tert-butyloxycarbonyl groups; present X, Y and Z are ether bonds, present  $l + m + n = 8$ . Nishikubo teaches (see DERWENT abstract) that his composition is useful for making LSI or VLSI. Nishikubo teaches that in his formula (1), R3 can be H atom as well as tert-butoxycarbonyl group (see DERWENT abstract). Since present specification states that a photoacid generator may be added, Nishikubo teaches present inventions of claims 1-8, 10, 12, 16 and 17 (since Nishikubo's

compound teaches present compound, Nishikubo's compound would inherently satisfy present limitation of claim 2).

5. Claim 24 is rejected under 35 U.S.C. 102(e) as being anticipated by Hanabata et al (WO 02/079131 A1 and its Chemical abstract 137:302225).

Hanabata teaches the following compound (see pg.112 of the WO'131):



to be used in a photosensitive resin composition (see Chemical abstract). Thus, Hanabata teaches present invention of claim 24 (-OCH(CH<sub>3</sub>)C<sub>2</sub>H<sub>5</sub>) shown above teaches present -OR of claim 24).

6. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by Sakamizu et al (**Chemical Abstract 1998:475830** – English abstract for “Structural Design of Resin Matrix and Acid-labile Dissolution Inhibitor of Chemical Amplification Positive Electron-beam Resist for Gigabit Lithography”, Journal of Photopolymer Science and Technology (1998), vol.11 (4), Pg.547-552)).

Sakamizu teaches (see the chemical structure shown on the second page of the chemical abstract) present compound of claim 25 (present B, C and D being 1-tetrahydropyranyl groups and present X, Y and Z being ether bonds).

***Claim Rejections - 35 USC § 103***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 9, 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikubo et al (JP 11-322656 and its English abstracts - Chemical Abstract and DERWENT abstract) in view of Niinomi et al (Proceedings of SPIE, Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185).

Nishikubo does not explicitly teach present range for the basic impurity content. It is well known in the art that basic impurities in a resist composition causes the problem of post exposure delay (PED), as evidenced by Niinomi et al, pg.174, last paragraph. Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity content in Nishikubo's photoresist material as low as possible in order to avoid the PED problem. Present range of 10 ppm or less for the basic impurity would have been obvious to one skilled in the art at the time the invention was made, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, Nishikubo in view of Niinomi would render obvious present inventions of claims 9, 11 and 15.

9. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishikubo et al (JP 11-322656 and its English abstracts - Chemical Abstract and DERWENT abstract) in view of Niinomi et al (Proceedings of SPIE, Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185) and Zhong et al (7,013,965).

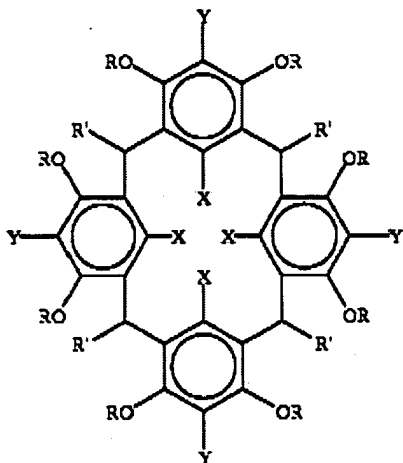
As discussed above, based on Nishikubo in view of Niinomi, it would have been obvious to reduce basic impurity in Nishikubo's composition in order to avoid the PED problem. It is known in the art to remove basic impurities in a composition by treating the composition with acid and with ion exchange resins as evidenced by Zhong et al, col.5, lines 9-10. Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity in Nishikubo's composition by using art-known methods such as treating with acid and ion exchange resins in order to avoid the PED problem. Therefore, Nishikubo in view of Niinomi and Zhong would render obvious present inventions of claims 13 and 14.

10. Claims 1-8, 10, 12, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (6,093,517).

Ito teaches the followings:

26. The composition of claim 17, wherein the dissolution inhibitor has the structure of formula (I)

(I)



wherein:

the R moieties may be the same or different and are selected from the group consisting of hydrogen and acid-labile protecting groups, with the proviso that at least one of the R moieties is an acid-labile protecting group;

the R' moieties are independently selected from the group consisting of hydrogen, halogen, nitro, alkyl, aryl, and alkaryl, and, if alkyl, aryl or alkaryl, optionally substituted with one to four substituents selected from the group consisting of hydroxy, halogen, lower alkyl, lower alkoxy and nitro; and

the X and Y moieties may be the same or different and are selected from the group consisting of hydrogen, alkyl, alkoxy, aryl, aralkyl, alkaryl, halo, cyano, nitro and carboxylate.

27. The composition of claim 26, wherein:

the R' are independently selected from the group consisting of hydrogen, bromo, C<sub>1</sub>-C<sub>12</sub> alkyl, and C<sub>1</sub>-C<sub>12</sub> alkyl substituted with a hydroxyl group, a halogen atom, a phenyl ring, or a phenyl ring bearing a hydroxy, halogen or lower alkyl substituent.

28. The composition of claim 27, wherein:

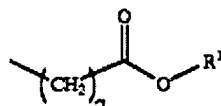
all X moieties are hydrogen, and the Y moieties are selected from the group consisting of hydrogen and lower alkyl.



29. The composition of claim 26, wherein:

all X moieties are hydrogen, and the Y moieties are selected from the group consisting of hydrogen and lower alkyl.

30. The composition of 26, wherein the acid-labile protecting groups have the structural formula



in which m is 0 or 1 and R¹ is CR²R³R⁴ wherein R², R³ and R⁴ are independently hydrogen, alkyl or aryl.

Based on Ito's teachings, it would have been obvious to one skilled in the art to have all X's and Y's of formula (I) to be H atoms, to have all R's to be methyl groups, to have all R groups to be the group of formula shown above in claim 30 in which R2-R4 are methyl groups (or to have seven R groups to be such groups of claim 30 and to have the other R group to be a H atom) and to have m to be 0 with a reasonable expectation of obtaining a resist composition with marked improvement in contrast. Ito teaches that his polymeric component of his resist composition can be a polymer that is inert with respect to the exposure and development process (col.11, lines 20-23). It would have been obvious to one skilled in the art to use such polymer as Ito's polymer with a reasonable expectation of obtaining a resist composition with marked improvement in contrast. Therefore, Ito's teaching render obvious present inventions of claims 1-8, 10, 12, 16 and 17 (present B, C and D being H atom or tert-butyloxycarbonyl groups).

11. Claims 9, 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (6,093,517) in view of Niinomi et al (Proceedings of SPIE, Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185).

Ito does not explicitly teach present range for the basic impurity content. It is well known in the art that basic impurities in a resist composition causes the problem of post exposure delay (PED), as evidenced by Niinomi et al, pg.174, last paragraph.

Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity content in Ito's photoresist material as low as possible in order to avoid the PED problem. Present range of 10 ppm or less for the basic impurity would have been obvious to one skilled in the art at the time the invention was made, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Therefore, Ito in view of Niinomi would render obvious present inventions of claims 9, 11 and 15.

12. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (6,093,517) in view of Niinomi et al (Proceedings of SPIE, Vol.2724, Advances in Resist Technology and Processing XIII (1996), pg.174-185) and Zhong et al (7,013,965).

As discussed above, based on Ito in view of Niinomi, it would have been obvious to reduce basic impurity in Ito's composition in order to avoid the PED problem. It is known in the art to remove basic impurities in a composition by treating the composition with acid and with ion exchange resins as evidenced by Zhong et al, col.5, lines 9-10. Therefore, it would have been obvious to one skilled in the art to reduce any basic impurity in Ito's composition by using art-known methods such as treating with acid and

ion exchange resins in order to avoid the PED problem. Therefore, Ito in view of Niinomi and Zhong would render obvious present inventions of claims 13 and 14.

***Allowable Subject Matter***

13. Claims 21, 22, 19, 20 and 23 are allowed. None of the cited prior arts teaches or suggests present inventions of claim 21 or 22.

***Response to Arguments***

14. Applicants argue that Ito'517 does not teach photoresist material "consisting essentially of" an extreme ultra-violet reactive organic compound of the claimed formula. However, as discussed above, Ito teaches that his polymeric component of his resist composition can be a polymer that is *inert* with respect to the exposure and development process. Thus, it is the Examiner's position that Ito still teaches present inventions of claims 1 and 5 (see MPEP 2111.03). Applicants also argue that Ito does not teach a photoresist base material that is able to suppress line-edge roughness of 1 nm or less. However, there is no evidence on the record that Ito's resist material is not able to suppress line-edge roughness of 1 nm or less. Beside, such limitation is not being claimed in present claims.

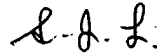
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

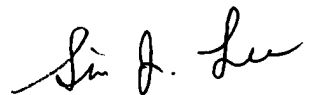
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
S. Lee  
December 9, 2007

  
**SIN LEE**  
**PRIMARY EXAMINER**